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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
WALTER, CRAIG E	

ART UNIT	PAPER NUMBER
2188	

DATE MAILED: 09/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/749,756	GROVER ET AL.	
	Examiner	Art Unit	
	Craig E. Walter	2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 June 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-8,10-15 and 17-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-8,10-15 and 17-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 June 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. Claims 1, 3-8, 10-15 and 17-21 are pending in the Application.

Claims 1, 3, 5, 7, 8, 10, 12, 14, 15, 17, 19 and 21 have been amended.

Claims 2, 9, and 16 have been canceled.

Claims 1, 3, 5, 7, 8, 10, 12, 14, 15, 17, 19 and 21 are rejected.

Response to Amendment

2. Applicant's amendments and arguments filed on 15 June 2006 in response to the office action mailed on 13 March 2006 (hereinafter previous Office action) have been fully considered, but they are not persuasive. Therefore, the rejections made in the previous office action are maintained, and restated below, with changes as needed to address the amendments.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 3-8, 10-15 and 17-21 are rejected under 35 U.S.C. 102(e) as being anticipated by Coulson (US PG Publication 2003/0074524 A1).

As for claims 1, 5, 8, 12, 15 and 19, Coulson teaches a method (medium and system) comprising:

a processor (Fig. 1, element 16 – paragraph 0019, all lines);

a non-volatile cache (NVC) coupled to the processor (Fig. 1, element 14), the NVC to serve as a cache for a hard drive (HD) of the system (paragraph 0014, all lines – cache is used in conjunction with the HD to improve performance); and

a machine readable medium having stored thereon a set of instructions which when executed (paragraph 0019, all lines – the controller contains code to execute the processes) cause the system to perform a method comprising of:

detecting within a system an occurrence of a predetermined event (paragraph 0020, all lines – memory request is sent (i.e. a read request) from the memory controller to determine in the cache can satisfy the request), including at least one of satisfying by a non-volatile cache (NVC) of a hard drive (HD) consecutive HD reads for at least a previous predetermined period of time, and satisfying by the NVC a previous predetermined quantity of consecutive HD reads (the predetermined quantity of consecutive reads will always be equal to the number of reads satisfied by the cache until a read operations cannot be satisfied by the cache, hence requiring disk access – paragraph 0033, all lines). Again

once the drive is spun down, the cache will continue to service requests until the controller determines otherwise.

in response to the predetermined event, changing a power state of the hard drive (HD) – paragraph 0035, all lines – in the case of a HD, the operations (reading and writing to and from the cache) will begin or end with the drive being spun down (i.e. change of power state). In other words, this allows the drive to be spun down in response to a request being satisfied by the cache;

servicing HD data transactions with the NVC while the HD is spun down (paragraph 0020, all lines) – if the cache can satisfy the request, the controller will use the cache rather than the HD. Subsequently, the controller will wait for another request. This process will repeat until the cache cannot satisfy the request, at which time the disk will be accessed (see the flowcharts in Fig.2) – again referring to paragraph 0035, the drive will be spun down if the operation can be satisfied by the cache.

Additional support is provided in paragraph 0033, all lines. Only read misses will cause the disk to be accessed (i.e. spun up – as the drive is to be spun down when not accessed as to conserve power). Memory accesses satisfied will be queued until the disk is needed. Paragraph 0021, all lines further discusses how access to the HD causes a spin up of the disk.

Further support for is provided in claim 32 (including the limitations of claim 30) from Coulson's disclosure - after satisfying the request via the cache, the drive is spun down.

For clarification, as presently recited, these claims are interrupted as:

the predetermined event includes detecting one of "consecutive HD reads that have been satisfied by the NVC for at least a previous predetermined period of time", and "a previous predetermined quantity of consecutive HD reads have been satisfied by the NVC". In other words, the event includes detecting either "consecutive HD reads ..." OR "a previous predetermined quantity ...".

Assuming *arguendo* the narrower interpretation of the claim (including both detecting based on a predetermined time and (emphasis added) a predetermined quantity, Coulson still continues to teach both events):

the predetermined event includes detecting consecutive HD reads that have been satisfied by the NVC for at least a previous predetermined period of time (the predetermined period of time is equal to the time it takes for the controller to determine that a read request goes unsatisfied – Again once the drive is spun down, the cache will continue to service requests until the controller determines otherwise).

Additionally note for claims 5, 12 and 19, Coulson teaches the predetermined event as including detecting a predetermined number of HD data transactions serviced by the NVC or the HD (once the memory controller determines the cache can satisfy the read request, it uses the cache rather than the HD to system conserve power –

paragraph 0020, all lines) – The HD can now be spun down to conserve power (paragraph 0035, all lines) – In this case the predetermined number can equal one read request.

As for claims 3, 10 and 17, Coulson teaches the predetermined event as further including determining a predetermined quantity of the NVC that would be available to service HD writes when the HD is spun down (since the entire NVC of Coulson's system is available for caching HD read/write operations, the predetermined quantity is the size of the NVC itself).

As for claims 4, 11 and 18, Coulson teaches changing the power state of the HD as including spinning down the HD - paragraph 0035, all lines – in the case of a HD, the operations (reading and writing to and from the cache) will begin or end with the drive being spun down (i.e. change of power state).

As for claims 6, 13 and 20 Coulson teaches the predetermined event further as including detecting a predetermined number of HD data transactions serviced by the NVC or the HD within a previous predetermined period of time (the number of HD transactions are predetermined as they equal the number of requests satisfied by the cache until a read operations cannot be satisfied by the cache, hence requiring disk access – paragraph 0033, all lines). The predetermined period of time is equal to the time it takes until an unsatisfied read request is transmitted from the controller.

As for claims 7, 14 and 21 the changing the power state includes spinning up the HD (a read request not satisfied by the cache causes a disk access request, hence causing the drive to spin up – paragraph 0020 and 0021, all lines).

Response to Arguments

4. Applicant's amendments and arguments with respect to claims 1, 3-8, 10-15 and 17-21 have been fully considered, but they are not persuasive.

As for claims 1, 8 and 15 Applicant contends "Coulson does not change the HD power state based on the history of NVC-served HD reads". Applicant further alleges "since Coulson cannot change the HD power state based on the history of NVC-serviced HD reads generally, it cannot do so particularly based on either historic NVC-serviced HD reads for a previous predetermined period of time, or on historic NVC-serviced HD reads for a previous predetermined quantity of reads. Therefore Coulson cannot change the power state of the HD in response to the predetermined event as claimed in the present invention". Applicant supports these allegations by directing Examiner's attention to paragraphs 0023 and 0033 of Coulson's teachings, in which Applicant's description of Coulson's teachings includes read misses as existing "where a read request could not be satisfied from cache", and "only read misses will cause the disk to be accessed". Applicant further asserts that read requests are satisfied depending on the current state of the cache, i.e. regardless of the history of NVC-serviced HD reads.

Applicant's arguments with respect to these claims are found to be not persuasive for the following reasons:

Claim 1 requires (in part) "detecting ... a predetermined event including ... satisfying by the NVC a previous predetermined quantity of consecutive HD

reads". Coulson teaches a controller determining if the cache can satisfy read or write commands intended for the disk, for the purposes of minimizing disk access in order to minimize power consumption (see paragraph 0020, all lines and the abstract). If the cache cannot satisfy the request, the disk will be accessed (paragraph 0021, all line). In other words, Coulson's system will continue to service the read requests via the cache until it is determined that the request cannot be serviced. The present invention, as currently claimed, requires "a predetermined quantity" of read operations. Giving these claims their "broadest reasonable interpretation consistent with Applicant specification (see MPEP § 2111), Coulson's describes his cache as servicing the read request for a "predetermined quantity" as similarly claimed by Applicant (i.e. the predetermined quantity equals the quantity of read operations that can be serviced by the cache). By no means must said predetermined quantity be a static value.

Additionally note as presented in the previous Office action, claim 32 (including the limitations of claim 30) specifically recites spinning down (i.e. changing the power state) of the disk, once the cache satisfies a request. In other words, a predetermined quantity of requests (i.e. one) changes the power state of the disk.

Assuming *arguendo* that Coulson does not teach "a predetermined quantity of consecutive reads" as alleged by Applicant, Coulson still teaches "satisfying by an non-volatile (NVC) of a hard drive (HD) consecutive HD reads for at least a previous predetermined period of time" as recited by Applicant in these claims, hence the claims remains anticipated. Coulson teaches that "at

least a previous predetermined period of time" as being the time it takes for the system to recognize a read request that cannot be serviced by the NVC. Again by no means must said predetermined time be a static value.

Claim 1 further requires "in response to the predetermined event, changing the power stat of the HD". Again, Coulson teaches servicing the requests via the cache until the system detects a request that cannot be satisfied by the cache (i.e. the subsequent read request that failed to be satisfied by the cache following the quantity of the previously read requests that have been satisfied by the cache). The disk is subsequently spun up and accessed (hence changing the power state of the disk) once that request goes unfulfilled (referring again to paragraphs 0020 through 0021, all lines).

As for claim 5, 12 and 19, Applicant's arguments are substantially similar to the arguments presented with respect to claims 1, 8 and 15, therefore Examiner maintains the rejections to these claims, and finds Applicant's arguments not persuasive as evidenced by the rejection and arguments presented *supra*. It is worthy to note that, Applicant further alleges that determining if a read request can be satisfied from cache depends on the content of the cache at the time, and not on the history of the HD data transactions. Examiner however maintains that since the NVC as described by Coulson services the HD read requests until it is no longer able, Coulson does in fact teach making the determination based on historical data transactions.

Applicant's assertion that each dependant claim incorporates allowable subject matter by further limiting one of the six base claims is rendered moot, as Examiner

maintains that Coulson in fact anticipates claims 1, 5, 8, 12, 15, and 19 per the rejections discussed *supra*.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

6. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Craig E. Walter whose telephone number is (571) 272-8154. The examiner can normally be reached on 8:30a - 5:00p M-F.

8. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on (571) 272-4210. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

9. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Craig E Walter
Examiner
Art Unit 2188

CEW

8/28/06